

CREEP RESISTANT ZIRCONIUM ALLOY
AND NUCLEAR FUEL CLADDING
INCORPORATING SAID ALLOY

ABSTRACT

The present invention provides a creep resistant zirconium alloy comprising a coarse grained lath alpha microstructure. The microstructure can include small second phase precipitates. The small second phase precipitates can have a diameter less than $0.15\mu\text{m}$. The microstructure can be partially recrystallized. The microstructure is an acicular structure and can include a lath spacing within the range from about 0.5 to about $3.0\mu\text{m}$. The microstructure is an acicular structure and can include a lath spacing within the range from about 0.5 to about $3.0\mu\text{m}$. The present invention provides a nuclear fuel cladding comprising an annular layer of the creep resistant zirconium alloy. The present invention also provides a method of manufacturing a creep resistant zirconium alloy comprising the steps of heat treating a zirconium alloy to form a first intermediate, fast quenching the first intermediate to form a second intermediate, cold working the second intermediate within the range from about 30% to about 40% to form a third intermediate, and annealing the third intermediate to effect partial recrystallization.